IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Jonathan Yen et al.
Serial No. : 09/844,324
Filed : April 26, 2001
Title : Detecting Halftone Modulations Embedded in an Image

Art Unit : 2757
Examiner : B. Edelman

Commissioner for Patents
Washington, D.C. 20231

DECLARATION UNDER 37 CFR § 1.131

We, Jonathan Yen, Daniel Tretter, and Ron Kimmel, hereby declare as follows.

1. We are the inventors of the subject matter recited in the pending claims of the above-identified patent application.

2. Prior to September 2000, we completed our invention as described and claimed in the above-identified patent application in this country, as evidenced by the following.

   a. Prior to September 2000, we conceived the idea of a method, system and computer program for detecting information embedded in an image. In accordance with this idea, for each of two or more different halftone modulations, a respective filter is applied to the image to identify an ordered sequence of halftone modulations embedded in the image. Also in accordance with this idea, each filter corresponds to a matched filter for a respective halftone modulation. The process of applying a respective filter to the image involves convolving the filter with the image.

   b. Prior to September 2000, we made a physical embodiment of the computer program of ¶ 2.a that was executable by a data processing system to provide the functionality of the information detection system of ¶ 2.a. We operated this physical embodiment to carry out the steps of the information detection method of ¶ 2.a in a manner demonstrative of the workability of the idea of ¶ 2.a.

   c. The reduction to practice of the physical embodiment of ¶ 2.b is evidenced by the slides that are selected from a set of slides entitled "Recognition of

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Halftone Structures" and are attached hereto as Exhibit A. The cover sheet of this set of slides is dated prior to September 2000. These slides were presented during a confidential meeting internal to Hewlett-Packard Company prior to September 2000. The slides of Exhibit A differ from the corresponding slides originally presented only by the inclusion of a footer (i.e., "Slide n/33" where n is the slide number) uniquely labeling each slide for the purpose of this Declaration.

d.   The slides of Exhibit A describe a method of detecting halftone microscreens that are embedded in an image. In accordance with this method, for each of two or more different halftone modulations, a respective filter is applied to the image to identify an ordered sequence of halftone microscreens that are embedded in the image (see, e.g., Slides 3 and 7). Also in accordance with this method, each filter corresponds to a matched filter for a respective halftone modulation (see Slide 7). The process of applying a respective filter to the image involves convolving the filter with the image (see Slide 10).

e.   As evidenced by slides 10-33 of Exhibit A, the physical embodiment of ¶ 2.b was built to implement the method of ¶ 2.d, and this physical embodiment was tested to demonstrate the workability and practicality of the information detection method, system and computer program of ¶ 2.a. Slide 28 shows the arrangement of two different halftone microscreens that the physical embodiment of ¶ 2.b detected in a scanned image. Slide 30 shows a comparison of the information detection results of the physical embodiment of ¶ 2.b and the correct arrangement of halftone microscreens that were embedded in the scanned image.

f.   The results of the tests presented in slides 13-20, 23-26, and 28-31 demonstrated the workability and practicality of the information detection method, system and computer program of ¶ 2.a. For example, the last slide of Exhibit A concludes that "Matched filters are useful for the recognition of image halftone structures."
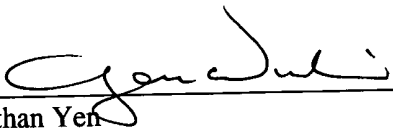
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    3.   We declare that all statements made herein of our own knowledge are true and that all statements made on declaration and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

Date: 7/19/04

Jonathan Yen

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Date: 19 July 2004

Daniel Tretter

Daniel Tretter

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Date: 7/14/04

Ron Kimmel